Higher-Order Memory Schema and Consciousness Experience

The target article makes a case for Attention Schema Theory (AST), which positions attention schema as the key for understanding consciousness. In building their case, the authors distinguish between two novel terms: i-consciousness and m-consciousness. They do not make an attempt to connect these new terms to established terms used in consciousness science, but they do say that i-consciousness relates to information processing in the brain whereas m-consciousness is a mysterious non-physical aspect of conscious experiences. They propose that this aspect of m-consciousness is a kind of illusion about consciousness; the ghostliness of dualism seems like it is there but is not.

AST seeks to explain the ghostly illusion. This makes their model a version of weak illusionism (Chalmers 2018). The authors stress that they do not deny the existence of consciousness. As they say, 'someone is home, but that someone is slightly misled about his or her exact nature' (p14).

Here, we think, the authors make a fundamental error. They suggest that the notions of *phenomenal consciousness*, *subjective awareness*, or *what it is like* to have a mental life, carry with them an implicit commitment to something non-physical. For them, subjective experience refers to a non-physical property that we do not in fact have; what we have instead, are inaccurate representations of I-consciousness by attention schema. But if there is indeed 'someone home' then there is subjective experience, and their theory can be thought of as an account of that kind of phenomenal consciousness.

Although phenomenal consciousness is sometimes discussed in connection with dualism (Nagel 2012), a commitment to dualism is an extra theoretical claim and is not itself built into the concept of phenomenal consciousness. Phenomenal consciousness is just experience and can be characterized by what it is like to have the experience. In fact, consciousness science does not seek to explain how the mind has a non-materialistic subjective experience (p. 12-13). It assumes that there is subjective experience and then looks for the brain mechanisms that correlate with it and -hopefully- ultimately explain it. The authors seem to be motivated by a need to provide an answer to Chalmers' Meta-Problem of consciousness (Chalmers 2018) but there is some dispute about whether a theory of consciousness does indeed owe an explanation for why a Hard Problem of consciousness seems to exist (Rosenthal 2019). Even if one thinks the meta-problem is one that a theory of consciousness should address, it need not do so by stipulating that the physical processes appealed to describe consciousness explicitly as non-physical.

In arguing their case, the authors build on Global Workspace Theory (GWT) and Higher-Order Thought (HOT) theory. Key to the AST model is a schema description of global workspace activity. And the illusion proposed is a higher-order state, not

unlike a metacogntive state, that supplies content. They thus suggest that AST can be thought of as a unification of GWT and HOT.

Their position is, in some ways, a logical unification of GWT and HOT since proponents of both advocate the involvement of cognitive processes and prefrontal cortex (PFC) in consciousness (Lau and Rosenthal, 2011; Baars, 1998; Dehaene 2014). For example, in GWT PFC is part of a network that ignites widespread broadcasting of information and in HOT it contributes to phenomenal content. However, as presented, AST does not accurately capture the essence of HOT.

For one thing, as suggested above about physicalist theories in general, HOT is a theory about the nature of subjective experience. It is not a theory of why we merely say we have conscious experience (p 15). Higher-order theories argue that people do in fact have physical (brain instantiated) subjective experiences. The authors seem to assume that HOT is a theory that is by its nature illusionist. We see no reason to think that higher-order theory builds into the higher-order representations the assumption that consciousness is a mysterious non-physical property. Second, HOT requires that one be aware of one's mental life, and postulates that this kind of inner awareness consists in a re-representation of what is occurring at the lower-order levels. However, the authors explicitly deny that the attention schema involves re-representing visual stimuli (p 36). The attention schema contains higher-order information in that it is a description of what is happening at the highest levels of attentional processing, which they equate with being in the global workspace. They add that it offers a rough sketch that simplifies what is actually happening in the global workspace, but whatever the description is in the attention schema, it does not amount to the kind of thought-like awareness required to be aware of one's mental states, such a proposed in HOT.

Part of the problem may stem from a conflation of metacognition and higher-order consciousness (see Brown et al 2019). They both depend on some common neural mechanisms involving PFC but are not equivalent--a metacognitive state is not necessarily what allows one to know that they are having the experience. HOT postulates that a specific kind of metacognitive state, one which results in being aware of one's own mental life, is required for conscious experience. Many, if not most, metacognitive states will not result in this kind of higher-order awareness. Typical metacognition is conscious, in that one is aware that one is engaging in it, and effortful. The kind of higher-order awareness appealed to here is not something which one is aware of engaging in and it happens effortlessly and automatically. Traditional HOT theory postulates that the way in which we are aware of our mental functioning is by automatically having a thought-like, conceptual or intentional, state with the content that one is in the first-order state. Ultimately these representations are nothing but brain activity.

As we read AST it proposes that mental models based on attention schema are what add the subjective quality to visual experience, albeit one which mis-describes what is really going on in one's global workspace. The authors recognize that other kinds

of schema exist, such as decision and memory schema, but argue that these are not as tightly correlated with consciousness as attention, and therefore less relevant to consciousness. But it is the lack of an account of the content of experience by attention schema that limits what AST can say about consciousness. Perhaps memory schema are what is needed.

We have proposed versions of higher-order theory that emphasize memory schema, treating them as lower-order (non-conscious) states that function as templates that are pattern-completed by physical and social situations (LeDoux and Brown, 2017; LeDoux, 2015, 2019a, 2019b; Brown et al, 2019). Memory schema, in our model, form the basis for higher-order subjective experiences. Perhaps the non-conscious kind of attention discussed in connection with AST is what assembles active non-conscious memory schema, and then additional attentional processes select from schematic content what we are aware of in the moment. This, we suggest, would be a true union of GWT, AST and higher-order theory. GWT and AST provide crucial accounts of how lower-order states are assembled and maintained, but higher-order theory provides the account of subjective experience.

In closing we note that there is a sense in which the higher-order theory we propose has elements of weak illusionism, but without ghostly dualism. To know what we are seeing requires memory and concepts (which themselves are a form of memory). In our memory schema model, what we see is thus not what is in the world but what our schema tells us about what is present. The schema are non-conscious mental models that provide "priors," allowing us to use lower-order information to predict what is there before the lower-order processes have completed the job. Consciousness, in this perspective, is a memory-based higher-order expectation about what is present now. But a similar mechanism, relying solely on memory rather than sensory information, can also allow us to be conscious of what happened to us in the past, and what might be headed our way in our future. Images, hallucinations, thoughts and feelings in the absence of sensory support are physicalist forms of illusion. But perhaps perception is as well (Clark, 1998; Frith, 2007; Lau and Brown, 2019).

References

Baars BJ (1988) A Cognitive Theory of Consciousness. New York: Cambridge University Press.

Brown, R, Lau, H, and LeDoux JE (2019) Understanding the Higher-Order Approach to Consciousness. Trends in Cognitive Science 23(9). p Pps 754-768.

Clark A (1998) Being There. Cambridge, MA: MIT Press.

Chalmers, D. (2018) The Meta Problem of Consciousness. Journal of Consciousness Studies, 25, No. 9–10, pp. 6–61.

Dehaene, S. (2014) Consciousness and the Brain: Deciphering How the Brain Codes Our Thoughts, Penguin Books.

Frankish K (2017) Illusionism: as a theory of consciousness. Imprint Academic.

Frith C (2007) Making Up the Mind: How the brain creates our mental world. Malden, MA: Blackwell Publishing.

Lau H, and Brown R (2019) The Emperor's New Phenomenology? The Empirical Case for Conscious Experience without First-Order Representations. In: Blockheads (Pautz, A. and Stoljar, D., eds) Cambridge, MA: MIT Press.

Lau, H. and Rosenthal, D. (2011) Empirical support for higher-order theories of conscious awareness. Trends Cogn. Sci. 15, 365–373.

LeDoux, JE (2015) Anxious: Using the brain to understand and treat fear and anxiety. New York: Viking.

LeDoux, JE (2019a) The Deep History of Ourselves: The four-billion-year story of how we got conscious brains. New York: Viking.

LeDoux, JE (2019b) An Emotion Is.... Pyschology Today. https://www.psychologytoday.com/us/blog/i-got-mind-tell-you/201911/emotion-is

LeDoux, JE and Brown, R (2017) A Higher-Order Theory of Emotional Consciousness. Proceedings of the National Academy of Sciences of the United States 114(10): E2016-E2025.

Nagel, T (2012). Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature Is: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False. Oxford University Press USA.

Rosenthal, D (2019) “Chalmers’ Meta Problem” Journal of Consciousness Studies, 26, No. 9–10, pp. 194–204.